AI FOR NETWORKING

NETWORK RESOURCE MANAGEMENT

- Managing and allocating resources for networking processes.

TRAFFIC PREDICTION

- Resources can be assigned differently **depending on the amount of network traffic** that is being processed

USECASES

No.	Approach	Task	Dataset
1	Supervised: prediction with Hidden-Markov Model (HMM)	Traffic volume prediction	Synthetic and real traffic traces with flow statistics
2	Supervised: Multi-Layer Perceptron-NN	End-to-end path bandwidth availability prediction (TSF)	NSF TeraGrid dataset
3	Supervised: MLP-NN with different training algorithms (GD, CG, SS, LM, RP)	Network traffic prediction (TSF)	1000 points dataset
4	Supervised: KBR · LSTM-RNN	Inferring future traffic volume based on flow statistics (regression)	Network traffic volume and flow count collected every 5 min over a 24-week period
5	Supervised: Multi-Layer Perceptron-NN	Link load prediction in ISP networks (TSF)	Internet traffic collected at the POP of an ISP network

RESOURCE ALLOCATION

- Resource allocation is a decision problem that actively manages resources to maximize resource utilization.

USECASES

No.	Approach	Network	Task (Output)	Dataset
1	Supervised: MLP-NN	Wireless Networks	Throughput · Delay · Reliability	Simulation data generated using ns-Miracle simulator
2	Supervised: MDP · BN	VNF chains	Dynamically allocate resources for NFV components · Future resource reliability	Simulation data generated using Workflow Sim
3	Supervised: FNN	VNF chains	Resource requirements of each VNFC	VoIP traffic traces
4	Supervised: MLP-NN	Wireless LAN	Throughput of an access point	Synthetic data generated using testbed
5	Supervised: Linear classifier Unsupervised: RNN	Wireless networks	Quality level of each video in terms of the average SSIM index	38 video clips taken from CIF

ADMISSION CONTROL

- The objective in admission control is to optimize the utilization of resources by monitoring and managing the resources in the network **(Acceptance or Rejection).**

USECASES

No.	Approach	Network	Task (output)	Dataset
1	Supervised: MLP-NN	Wireless LAN	Whether an access point can sustain the new VoIP call	ns-3 simulator and testbed
2	Supervised: NN · BN	Cellular (LTE) network	Estimate the R-factor QoS metric	ns-3 simulator
3	Supervised: BN	Wireless LAN	Voice call quality	ns-3 simulator
4	Supervised: MLP-NN	ATM	Acceptance or rejection of a call	Simulation